

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1-17. (Canceled).

18. (Original) An interconnect structure with dielectric barrier, comprising:
a semiconductor substrate;
a plurality of stacked structures formed thereon, wherein each stacked structure comprises
a conductive line and a conductive plug thereon;
a conformal dielectric barrier over the surfaces of the stacked structures; and
a blanket second dielectric layer formed over the dielectric barrier to form an inter-metal
layer for insulation thereof.

19. (Original) The interconnect structure as claimed in claim 18, further comprising
an etching stop layer disposed between the semiconductor substrate and the dielectric barrier.

20. (Original) The interconnect structure as claimed in claim 18, wherein the etching
stop layer comprises oxygen-containing material.

21. (Original) The interconnect structure as claimed in claim 20, wherein the oxygen-
containing material comprises silicon oxycarbide (SiCO) or silicon carbonitride (SiCN).

22. (Original) The interconnect structure as claimed in claim 18, wherein the first
dielectric layer comprises a plurality of oxygen-free dielectric layers.

23. (Original) The interconnect structure as claimed in claim 22, wherein the oxygen-
free dielectric layers comprise silicon carbide, P-SiLK or other porous low-k dielectric.

24. (Original) The interconnect structure as claimed in claim 18, wherein the conductive line comprises copper or copper aluminum alloy.
25. (Original) The interconnect structure as claimed in claim 18, wherein the conductive plug comprises copper or copper aluminum alloy.
26. (Original) The interconnect structure as claimed in claim 18, wherein the dielectric barrier comprises silicon oxycarbide (SiCO) or silicon carbonitride (SiCN) with a dielectric constant of 4.5-5.0.
27. (Original) The interconnect structure as claimed in claim 18, wherein the second dielectric layer comprises carbon-incorporated silicon oxide (SiOC) with a dielectric constant of 2.5-3.0.
28. (Original) The interconnect structure as claimed in claim 18, further comprising at least one air-gap in the second dielectric layer between the stacked structures.
29. (Original) An interconnect structure with dielectric barrier, comprising:
a semiconductor substrate;
a pair of stacked structures formed thereon, wherein each stacked structure comprises a conductive line and a conductive plug thereon; and
a conformal dielectric barrier disposed along sidewalls of each stacked structure.
30. (Original) The interconnect structure as claimed in claim 29, further comprising a blanket second dielectric layer formed on the dielectric barrier to form an inter-metal layer.
31. (Original) The interconnect structure as claimed in claim 29, wherein the dielectric barrier is disposed along the substrate between the stacked structures.

32. (Original) The interconnect structure as claimed in claim 29, further comprising an etching stop layer disposed between the semiconductor substrate and the dielectric barrier.
33. (Original) The interconnect structure as claimed in claim 32, wherein the etching stop layer comprises oxygen-containing material.
34. (Original) The interconnect structure as claimed in claim 33, wherein the oxygen-containing material comprises silicon oxycarbide (SiCO) or silicon carbonitride (SiCN).
35. (Original) The interconnect structure as claimed in claim 29, wherein the first dielectric layer comprises a plurality of oxygen-free dielectric layers.
36. (Original) The interconnect structure as claimed in claim 35, wherein the oxygen-free dielectric layers comprise silicon carbide, P-SiLK or other porous low-k dielectric.
37. (Original) The interconnect structure as claimed in claim 29, wherein the conductive line comprises copper or copper aluminum alloy.
38. (Original) The interconnect structure as claimed in claim 29, wherein the conductive plug comprises copper or copper aluminum alloy.
39. (Original) The interconnect structure as claimed in claim 29, wherein the dielectric barrier comprises silicon oxycarbide (SiCO) or silicon carbonitride (SiCN) with a dielectric constant of 4.5-5.0.
40. (Original) The interconnect structure as claimed in claim 30, wherein the second dielectric layer comprises carbon-incorporated silicon oxide (SiOC) with a dielectric constant of 2.5-3.0.

41. (Original) The interconnect structure as claimed in claim 30, further comprising at least one airgap in the second dielectric layer between the stacked structures.